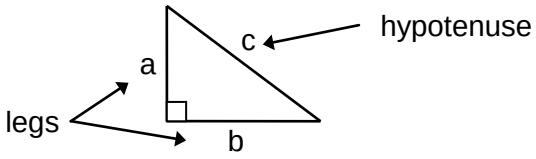
TRIGONOMETRY

PYTHAGOREAN THEOREM

Used in Right Triangles (one angle must be 90 degrees)

$a^2 + b^2 = c^2$



Hypotenuse - it's the side opposite the right angle. It is the longest side.

Legs - are the sides adjacent to the right angle.

SQUARE ROOTS

To use the Pythagorean Theorem you must be able to do square roots.

1. $\sqrt{25} = 5$

2. $\sqrt{24} = 4.9$

3. $\sqrt{37} = 6.08$

4. $x^2 = 25$

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5$

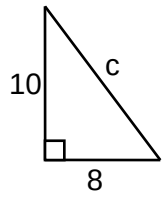
5. $x^2 = 48$

$\sqrt{x^2} = \sqrt{48}$

$x = \pm 6.93$

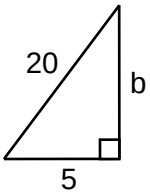
PYTHAGOREAN THEOREM EXAMPLES

1.



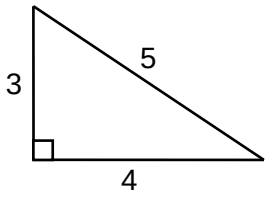
$a^2 + b^2 = c^2$
$10^2 + 8^2 = c^2$
$100 + 64 = c^2$
$164 = c^2$
$c = 12.81$

2.

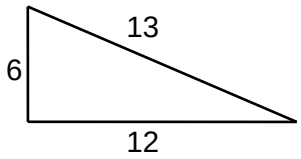


$a^2 + b^2 = c^2$
$5^2 + b^2 = 20^2$
$25 + b^2 = 400$
$b^2 = 375$
$b = 19.37$

Check the following to see if they are Right Triangles:

1. 

$a^2 + b^2 = c^2$
$3^2 + 4^2 = 5^2$
$9 + 16 = 25$
$25 = 25$
Yes, this is a Right Triangle.

2. 

$a^2 + b^2 = c^2$
$6^2 + 12^2 = 13^2$
$36 + 144 = 169$
$280 \neq 169$
No, this is not a Right Triangle.

3. Having three sides: 5, 8, and 15

$a^2 + b^2 = c^2$
$5^2 + 8^2 = 15^2$
$25 + 64 = 225$
$89 \neq 225$
No, this is not a Right Triangle.

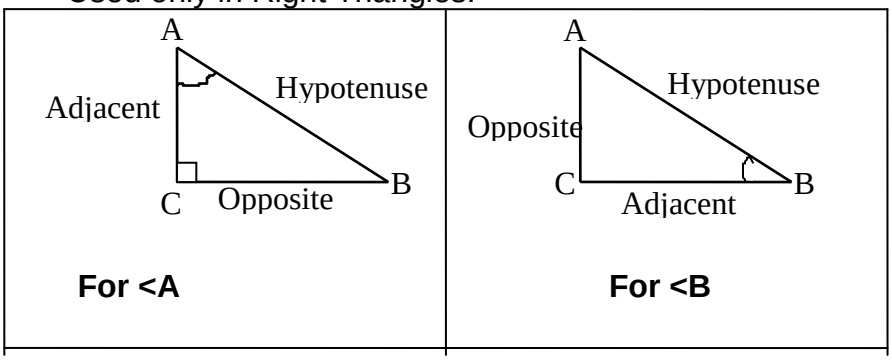
Assignment: Pythagorean worksheet

TRIGONOMETRY

Trigonomic Ratios

Involves triangle measurements. They are ratios based on the sides of the angle and are specific to each acute angle.

** Used only in Right Triangles.



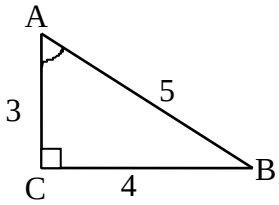
3 Ratios:

(a) Sine = $\frac{\text{opposite side}}{\text{hypotenuse}}$

(b) Cosine = $\frac{\text{adjacent side}}{\text{hypotenuse}}$

(c) Tangent = $\frac{\text{opposite side}}{\text{adjacent side}}$

STATE the 3 trigonomic Ratios for <a in the following:



SinA = $\frac{BC}{AB} = \frac{4}{5} = 0.8$

CosA = $\frac{AC}{AB} = \frac{3}{5} = 0.6$

TanA = $\frac{CB}{AC} = \frac{4}{3} = 0.75$

We can use these to find the measure of angles:

** Look in text book on page 624 to get measure of angle.

or

Use Calculator

To Help remember **SOHCAHTOA**

Sine = opposite over Hypotenuse, Cosine = Adjacent over hypotenuse,
Tan = opposite over adjacent.

FIND THE FOLLOWING:

The measure of the angle:

(a) Sin 53^0 (b) Tan 81^0

The ratio:

(a) SinA = 0.4384 (b) TanA = 11.4301

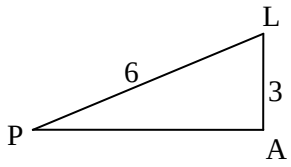
<A = <A =

TRIGONOMETRY

Applying Trigonomic Ratios

Given two pieces of information of a right triangle, the measure of the other unknown sides or angles can be determined using the Trig ratios (Sine, Cosine, and Tan)

Example1 Find the measure of angle P



Step 1 - Decide which of the 3 trig functions to use based on the given information.

Since 3 is the side ***opposite*** <P and 6 is the ***hypotenuse*** we will use the Sine ratio to determine the measure of <P.

Step 2 SineP = opposite = 3 = .5

hypotenuse 6

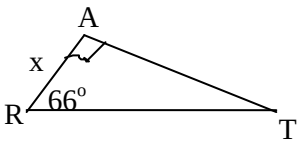
Step 3 Use the table of trig valuesor your calculator to determine the value of <P.

SineP = 0.5

<P = [2ndF] [Sin] 0.5

<P = 30^0

Example 2 **Find the value of x to the nearest decimal place.**



1st step - Decide which of the 3 trig functions to use based on the given information.

Since 11.2 is the side ***opposite*** to <R and side x is the ***adjacent*** to <R, we will use the tangent ratio to determine the value of x.

2nd step - $\text{TanR} = \frac{\text{opposite}}{\text{adjcent}}$

$\text{Tan60} = \frac{11.2}{x}$

$2.2460 = \frac{11.2}{x}$

3rd step - Solve the equation.

$2.2460 = \frac{11.2}{x}$

$2.2460x = \left(\frac{11.2}{x}\right)x$ multiply both sides by x

$2.2460x = 11.2$

$\frac{2.2460x}{2.2460} = \frac{11.2}{2.2460}$ divide both sides by 2.2460

$x = 4.9866$

$x = 5$